Lineament mapping and analysis using PCA SPOT 5 image at northern Maran, Pahang

Lineament is a simple or composite straight feature on the earth surface that can be mapped. Principal component analysis (PCA) is a method of analysis on multi variable to minimize the dimension of original variables to obtain a new variable (main component) that is not correlated among each other and contains most information as compared to the original variable. The objective of this research is to map and analysis lineaments from PCA SPOT 5 image and to do fault analysis and correlation between final lineament map that is produced and published fault map. This research uses SPOT 5 image with area of 2400 km² that is located at northern Maran, Pahang. Generally, the study area consists of Upper Paleozoic sediments (Seri Jaya Bed), Mesozoic (Semantan Formation and Tembeling Formation) and granitoid intrusive. Before the extraction of lineament, SPOT 5 image is processed digitally which includes geometric correction, radiometric correction, contrast enhancement and has gone through directional filtering and non directional filtering to increase the quality of image. Methods that is used in this research include the application of PCA method in producing PCA 1 SPOT 5 image, filtering of produced image in four main directions, combining of filtered images according to the direction of filter by using the concept of PCA and matching method is used to find out the percentage of matching between final lineament map and published fault map. Result from this research shows PCA 1 SPOT 5 image contains 76.16 % information and 889 lineaments with a total length of 2350 km is mapped from PCA 1 image. Besides, the main direction of lineament at Northern Maran that is obtained from this research is in NW-SE direction and this research manages to map 11 major lineaments besides elongate 1 lineament that is mapped in the published fault map. The result also shows there is 60.69% of matching between final lineament map and published fault map which shows high correlation between the final lineament map and published fault map.

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